CLAIMS

I claim:

1. A method for color calibrating a transmissive display system comprising the steps of:

applying signal values that select a target color in a look-up table in said display system to establish color on a screen of said display system;

noting color displayed on said screen;

comparing said color to said target color to determine if said color is within a specified tolerance range; and

calibrating said display system when it is not within said tolerance range to provide a color within said tolerance range.

2. The method of claim 1 wherein said color comparing step includes the steps of:

determining an evaluation parameter for said color;

determining a target evaluation parameter for said target color;

comparing said color evaluation parameter to said target color evaluation parameter to establish a parameter difference value;

comparing said parameter difference value to said specified tolerance range; and

correcting said color when said parameter is not within said tolerance range.

3. The method of claim 2 wherein said correcting step includes the steps of:

adjusting said signal values for said target color to obtain modified signal values;

establishing an evaluation parameter for color displayed in response to said modified signal values; and

comparing said response color to said target color to determine if said response color is within said specified tolerance range of said target color.

4. The method of claim 3 wherein said signals adjusting step includes the steps of:

creating a tristimulus table having tristimulus values for said primary colors for each signal value over an entire signal value range;

determining backlight tristimulus values;

subtracting backlight tristimulus values from corresponding tristimulus values in said tristimulus table to provide a corrected table;

subtracting said backlight tristimulus values from corresponding target color tristimulus values to provide corrected target color tristimulus values; and

utilizing said corrected table and said corrected target color tristimulus values to obtain estimated primary color luminance values corresponding to said target color.

5. The method of claim 4 wherein said utilizing step includes the steps of:

forming a matrix of primary color tristimulus values obtained by accessing said corrected table at maximum signal values;

calculating an inverse matrix of said matrix;

multiplying a vector formed by said corrected target color tristimulus values by said inverse matrix to obtain a vector of primary color luminance values, each component of said vector representative of a primary color luminance value;

entering said corrected table with each component of said vector to obtain a new signal value for each primary color luminance value;

utilizing each new signal value to extract tristimulus values for a corresponding primary color from said corrected table, thereby providing extracted primary color tristimulus values;

adding corresponding tristimulus values of said extracted primary color tristimulus values and said backlight tristimulus values to obtain estimated tristimulus values;

adding said backlight tristimulus values to corresponding corrected target color tristimulus values to obtain target color tristimulus values;

using said estimated tristimulus values to establish an estimated evaluation parameter;

comparing said estimated evaluation parameter to said target evaluation parameter; and

performing an iteration, utilizing a matrix formed with said estimated tristimulus values and said primary color luminace values, if said estimated evaluation parameter is not within said tolerance.

6. The method of claim 5 wherein said iteration performing step includes the steps of:

creating a new matrix utilizing said extracted primary color tristimulus values;

calculating an inverse matrix of said new matrix, thereby providing a new inverse matrix;

multiplying said vector formed by said corrected target color tristimulus values by said new inverse matrix to obtain a new vector of primary color luminance values, each component of said new vector representative of a primary color;

entering said corrected table with each component of said new vector to obtain a further new signal value for each primary color;

utilizing each further new signal value to extract new tristimulus values for a corresponding primary color from said corrected table, thereby providing new extracted primary color tristimulus values;

adding corresponding tristimulus values of said new extracted primary color tristimulus values and said backlight tristimulus values to obtain new estimated tristimulus values;

using said new estimated tristimulus values to establish an estimated evaluation parameter;

comparing said estimated evaluation parameter to said target evaluation parameter; and

performing another iteration, utilizing a matrix formed with said estimated tristimulus values and said primary color luminance values, if said estimated evaluation parameter is not within said tolerance.

7. The method of claim 5 wherein said another iteration performing step includes the steps of:

creating a new matrix utilizing said extracted primary color tristimulus values;

calculating an inverse matrix of said new matrix, thereby providing a new inverse matrix;

multiplying said vector formed by said corrected target color tristimulus values by said new inverse matrix to obtain a new vector of primary color luminance values, each component of said new vector representative of a primary color;

entering said corrected table with each component of said new vector to obtain a further new signal value for each primary color;

utilizing each further new signal value to extract new tristimulus values for a corresponding primary color from said corrected table, thereby providing new extracted primary color tristimulus values;

adding corresponding tristimulus values of said new extracted primary color tristimulus values and said backlight tristimulus values to obtain new estimated tristimulus values;

using said new estimated tristimulus values to establish an estimated evaluation parameter;

comparing said estimated evaluation parameter to said target evaluation parameter; and

modifying said display system to access said new signal value to display said target color if said estimated parameter is within said tolerance range.

8. The method of claim 7 further including the steps of:

applying signal values for a color within said specified tolerance range in a first ambient light condition;

lowering said backlight luminance, in a second ambient light condition, from a first backlight luminance until a desired contrast level is achieved, thereby determining a second backlight luminance; and

establishing said second backlight luminance for operation in said second ambient light condition.

9. The method of claim 4 wherein said utilizing step includes the steps of:

forming a matrix of primary color tristimulus values obtained by accessing said corrected table at maximum signal values;

calculating an inverse matrix of said matrix;

multiplying a vector formed by said corrected target color tristimulus values by said inverse matrix to obtain a vector of primary color luminance values, each component of said vector representative of a primary color luminance value;

entering said corrected table with a component of said vector to obtain a new signal value for each primary color luminance value;

utilizing each new signal value to extract tristimulus values for a corresponding primary color from said corrected table;

adding corresponding tristimulus values of said primary color tristimulus values and said backlight tristimulus values to obtain estimated tristimulus values;

adding said backlight tristimulus values to corresponding corrected target color tristimulus values to obtain target color tristimulus values;

using said estimated tristimulus values to establish an estimated evaluation parameter;

comparing said estimated evaluation parameter to said target evaluation parameter; and

modifying said display system to access said new DAC value to display said target color if said estimated parameter is within said tolerance range.

10. The method of claim 9 further including the steps of:

applying signal values for a color within said specified tolerance range;

lowering backlight level from full brightness until a desired contrast level is achieved, thereby determining a second ambient light level backlight luminance; and

establishing said second ambient light level backlight luminance for operation in said second ambient light level.

11. The method of claim 1 further comprising the steps of:

checking color displayed on said screen in a second ambience light condition, to determine a second ambient light color;

comparing said second ambient light color to said target color to determine if said second ambient light color is within said specified tolerance range;

adjusting backlight level when said second ambient light color is not within said tolerance range to provide a color within said tolerance range.

12. The method of claim 9 further including the steps of:

applying signal values for a color within said specified tolerance range in said first ambient light;

lowering backlight luminance from a first luminance level until a second luminance level at which a desired color luminance is achieved in said second ambient light, thereby determining a second ambient light backlight luminance; and

establishing said second ambient light backlight luminance for operation in said second ambient light.

13. The method claim 4 further including the steps of:

lowering backlight luminance from a first luminance level to a second luminance level at which a desired color luminance is achieved;

establishing a ration of said first and second luminance levels; and

utilizing said ratio to modify said tristimulus table.

14. A transmissive display system comprising:

a look-up table coupled to receive signals representative of colors to be displayed on a screen of said transmissive display system, said look-up table having data accessed by said signals, said data determining illumination levels of primary color filters associated with pixels on said screen;

a backlight providing illumination of said primary color filters; and

a processor coupled to said backlight wherein backlight luminance is selected in accordance with ambient light conditions.

15. A transmissive display system in accordance with claim 14 wherein said processor includes a light sensor that senses ambient light levels and selects backlight luminance in accordance with sensed ambient light levels.

16. A tranmissive display system in accordance with claim 14 wherein said processor includes a light sensor that senses ambient light levels and provides an indication of optimum backlight luminance.

17. A transmissive display system in accordance with claim 14 wherein said processor includes a ratio determinator which provides a ratio of a first backlight luminance to a second backlight luminance; and

a luminance modifier coupled to said ratio determinator to modify target color luminance in accordance with said ratio.

17. A transmissive display system in accordance with claim 16 wherein said processor further includes a ratio determinator which provides a ratio of a first backlight luminance to a second backlight luminance; and

a luminance modifier coupled to said ratio determinator to modify target color luminance in accordance with said ratio.